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REMARKS ON SOME GECKOS FROM SOUTHWEST
ASIA, WITH DESCRIPTIONS OF THREE NEW
FORMS AND A KEY TO THE GENUS
TROPIOCOLOTES

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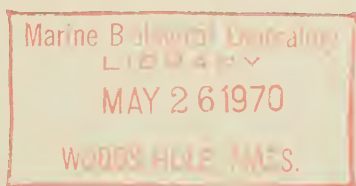
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INTRODUCTION

Systematic treatment of the geckos inhabiting the vast arid and semiarid region between northwestern Africa and western India involves numerous problems at both the genus and species level. During the past decade, collections made by the authors and others have resulted in the rediscovery of two geckos previously known only from the type descriptions and have indicated the need to describe three new taxa.

Blanford's genus *Bunopus* was reinstated by Strauch (1887) because of the tuberculate and denticulate nature of the subdigital lamellae of *B. tuberculatus* Blanford and *B. blanfordi* Strauch. Leviton and S. C. Anderson (1963) again resurrected this generic name for species with dorsal tubercles usually included in

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Alsophylax. Owing to early confusion in the literature, the type species of *Alsophylax*, *Lacerta pipiens* Pallas, had long been considered a tuberculate species by most workers. Actually, as Bedriaga (1912) showed, it is a nontuberculate form. Species with enlarged dorsal tubercles and tuberculate, pectinate subdigital lamellae are: *Bunopus tuberculatus*, *B. blanfordi*, *B. crassicauda*, and a fourth recently described species, *B. abudhabi*. *Bunopus spatulurus* John Anderson has been tentatively reassigned to a monotypic genus (Leviton and S. C. Anderson, 1967). Tuberculate species with smooth nontuberculate nonpectinate lamellae are *Alsophylax loricatus*, *A. microtus*, *A. przewalskii*, *A. spinicauda*, and *A. tibetanus*. *Alsophylax pipiens* and *A. laevis* are nontuberculate species with smooth, nonpectinate, nontuberculate subdigital lamellae. Further comments on the status of these two nominal genera are made by Mertens (1965) and Leviton and S. C. Anderson (1967). Final disposition is deferred until the Southwest Asian gecko-nid genera are subjected to general review.

ACKNOWLEDGMENTS

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The following abbreviation symbols are used in the text:

AMNH	American Museum of Natural History
CAS	California Academy of Sciences
FMNH	Field Museum of Natural History
NMW	Naturhistorisches Museum, Wien
RSM	Royal Scottish Museum
SAM	Sherman A. Minton
UMMZ	University of Michigan Museum of Zoology
USNM	United States National Museum

Bunopus crassicauda, described by Nikolsky in 1907 from the western part of the central plateau of Iran and known only from three syntypes, has recently been collected near Tehran. It is herewith redescribed.

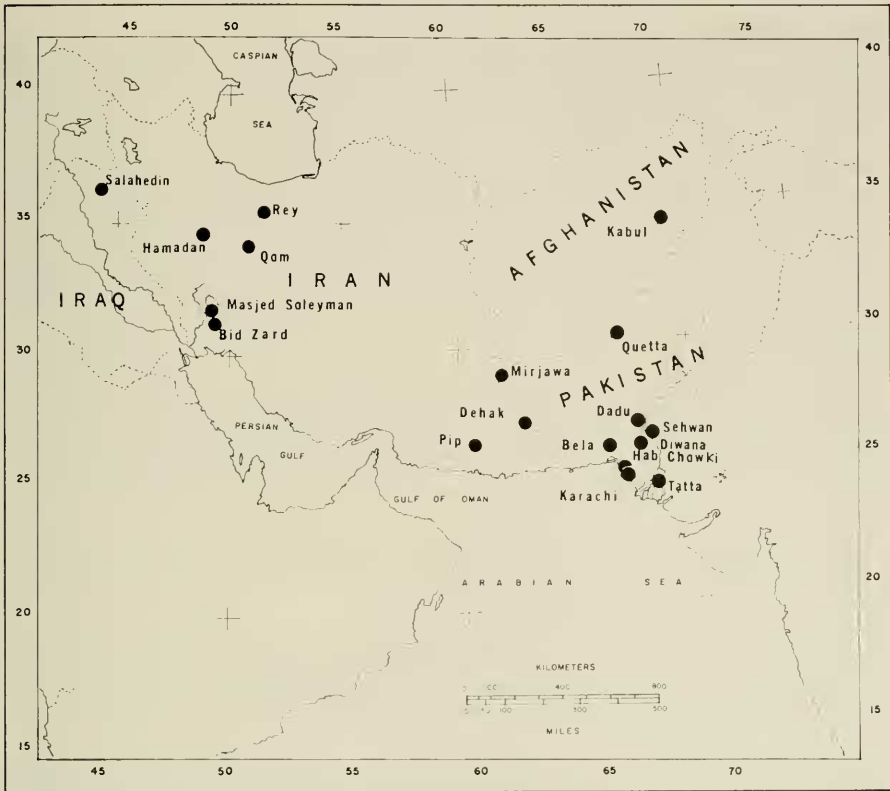


FIGURE 1. Southwest Asian localities mentioned in text.

Bunopus crassicauda Nikolsky.

(Figure 2.)

Bunopus crassicauda NIKOLSKY, 1907, Ann. Mus. Zool. Acad. Imp. Sci. St. Pétersbourg, vol. 10 (1905), pp. 261-264, pl. 1, fig. 2 (type locality: Iran: Irak-Adschemi Province: Kum [Qom]; Maljat-Abad; Chara-Magommed-Abad. Syntypes: Zoological Institute Lenin-grad 10230, 10345, 10233). WERNER, 1936, Festschrift Strand, vol. 2, p. 200 (listed). S. C. ANDERSON, 1963, Proc. Calif. Acad. Sci., 4th Ser., vol. 31, p. 476 (listed).

MATERIAL EXAMINED (2). SAM 930, AMNH 99663, Iran: Tehran Province, 15 miles southwest of Rey, collected 5 August 1965 by Sherman A. Minton, G. Possehl, W. Fairservis, and J. Fairservis.

DIAGNOSIS. A pair of postmentals in contact behind the pentagonal mental. Margins of subdigital lamellae pectinate.

DESCRIPTION. Rostral slightly broader than high, partially cleft dorsally; nostril bordered by rostral, first supralabial and three small scales; scales of snout and top of head subequal, juxtaposed; 6 to 8 supralabials, all anterior to posterior edge of eye; 8 or 9 infralabials, second touching anterior postmental;

mental shield-shaped, followed by a pair of large postmentals in contact with each other and a second smaller pair of postmentals widely separated; scales of mental and lateral gular region larger than those of median gular region. Vertical diameter of ear opening about $2/3$ vertical diameter of eye.

Dorsal scales small, juxtaposed, granular, separating about 13 irregular rows of enlarged tubercles. Ventral scales larger than dorsals, imbricate, smooth, not sharply differentiated from lateral scales, in 23–26 rows across mid-venter.

Forelimb reaches to anterior margin of eye; hind limb reaches almost to axilla. Digits cylindrical, not angulate between last and next-to-last phalanx. Subdigital lamellae in single row with margins pectinate; 14–16 lamellae on underside of fourth toe.

Basal portion of tail with segments each consisting of four whorls of imbricate scales, those of the most distal whorl being slightly larger than the others. This arrangement is not so evident in the distal half of the tail. No femoral or preanal pores or enlarged preanal or femoral scales; no enlarged platelike subcaudal scales.

Color in life pale brownish gray with darker transverse bands on body and tail; five bands on body counting one in nuchal and one in femoral region; nine dark bands on tail about equal to interspaces.

Both specimens apparently are adult females, snout-vent lengths 42 and 45.5 mm.; tail of larger specimen 44 mm. complete and unregenerated.

Bunopus crassicauda has the same type of dorsal tubercles and subdigital



FIGURE 2. *Bunopus crassicauda* (SAM 930).

lamellae as *B. tuberculatus*, *B. blanfordi* and *B. abundhabi*, a recently discovered species from the Persian Gulf coast of Arabia (Leviton and S. C. Anderson, 1967). It differs from these forms in having two large postmentals in contact behind the apex of the mental.

The two specimens of *B. crassicauda* were collected 5 August at the edge of a cultivated alluvial plain during mid-afternoon with the shade temperature 95° F. One animal was under a large clod of earth; the other was spotted moving under cover of small shrubs. It may, however, have been dislodged from some superficial hiding place.

The genus *Tropiocolotes* (Peters, 1880) was originally established for the species "*tripolitanus*." Subsequently the species "*steudneri*" (Peters, 1869) and "*nattereri*" (Steindachner, 1901) were added. Nikolsky (1907) established the monotypic genus *Microgecko* for the species "*helenae*." Mertens (1956) synonymized *Microgecko* with *Tropiocolotes*. S. C. Anderson (1963) reinstated *Microgecko* to include both "*helenae*" and "*steudneri*." Minton (1962) referred a population in Sind and Las Bela, West Pakistan to *Tropiocolotes helenae*, and Minton and J. A. Anderson (1965) described *T. depressus* from the Baluchistan mountains near Quetta.

Guibé (1966b) recognized the two genera as distinct on the basis of his study of nine specimens from West Pakistan, which he identified as *Microgecko helenae* (herein described as a new taxon, *Tropiocolotes persicus euphorbiacola*) and over 50 specimens of other species assigned to *Tropiocolotes*. He questioned the identity of the specimen from southwestern Iran identified as *M. helenae* by S. C. Anderson (1961; 1963), and Tuck's (in press) recent discussion of a series of *M. helenae* from southwestern Iran substantiates Guibé's doubts. Guibé also examined *Tropiocolotes depressus* Minton and J. A. Anderson, and concluded that it failed to fit his generic definitions of either *Tropiocolotes* or *Microgecko*. He did not reassign it, however, pending further study. The forms *Alsophylax persicus* Nikolsky and *Tropiocolotes scortecci* Cherchi and Spano' were not considered. Guibé regarded *Microgecko* as a monotypic genus, and *Tropiocolotes* as embracing four species, *T. steudneri*, *T. tripolitanus*, *T. somalicus*, and *T. occidentalis*.

Kluge (1967) recognized both *Microgecko* and *Tropiocolotes* in his discussion of familial relationships among the Gekkonidae. He stated that *Microgecko* has fused nasal bones and the hyoid cornu present, while in *Tropiocolotes* the nasal bones are paired and the hyoid cornu absent. One of us (S.C.A.), along with Dr. Alan E. Leviton, examined the hyoid apparatus of specimens of *T. persicus euphorbiacola* and *T. tripolitanus algericus* and found that the hyoid cornu (see Kluge, 1967, p. 37, fig. 7) is clearly present and well developed in both forms.

Subsequently, Kluge examined our specimen of *T. t. algericus* and confirmed our findings. The condition of the nasal bones is as stated by Kluge, who found it an interspecifically variable character in *Cnemaspis*, *Cyrtodactylus*, and *Phyllodactylus*. In light of present knowledge, we believe that the ends of taxonomy are better served if those forms variously referred to *Microgecko* and *Tropiocolotes* are all united under one genus.

Once the gekkonid genera of Southwest Asia have been defined adequately, it may prove desirable to include the forms here referred to *Tropiocolotes* under *Alsophylax* along with the small species from Afghanistan, northern Iran, and the USSR, perhaps recognizing subgeneric groupings. Certainly *Tropiocolotes heteropholis* (herein described) appears to differ more from *T. depressus*, for example, than the latter differs from the gecko from Kabul, Afghanistan, referred to *Alsophylax pipiens* by Leviton and S. C. Anderson (1963). Such a restructuring of the nominal genera cannot be undertaken, however, until our knowledge of the northern forms is more complete, and the identity of Pallas' *Lacerta pipiens* more definitely established.

Tropiocolotes Peters, 1880.

Tropiocolotes PETERS, 1880, Mon. Berlin Akad., p. 306, pl.—, fig. 1 (type species: *T. tripolitanus* Peters, by monotypy).

Stenodactylus BOULENGER (in part, not Fitzinger), 1885, Cat. Liz. British Mus., vol. 1, p. 16.

Microgecko NIKOLSKY, 1907, Ann. Mus. Zool. Acad. Imp. Sci. St. Pétersbourg, vol. 10 (1905), pp. 264–265 (type species: *M. helenae* Nikolsky, by monotypy).

DEFINITION. A gekkonine genus (in the sense of Kluge, 1967) rarely exceeding 35 mm. in snout-vent length; digits slightly angularly bent (but not so strongly as are those of, for example, *Cyrtodactylus*, *Agamura*), not dilated, fringed, webbed, or ornamented, covered below with a single series of transverse lamellae, either smooth or keeled (but not tuberculate in the sense of *Bunopus*); pupil vertical; dorsal scales imbricate to subimbricate, never juxtaposed granules; postanal sacs present; preanal and femoral pores usually absent (two preanal pores in male *T. steudneri* according to John Anderson, 1898, and in *T. depressus*); postmentals usually well developed, shieldlike (except in *T. depressus*). The genus includes eight species distributed from Spanish Sahara across northern Africa and the Middle East to the Indian Desert.

KEY TO THE SPECIES AND SUBSPECIES OF *Tropiocolotes*

- | | |
|---|---|
| 1a. Dorsals smooth or faintly keeled, ventrals smooth | 2 |
| 1b. Dorsals and ventrals strongly keeled | 8 |
| 2a. Scales along dorsal midline from axilla to groin 50 or less; four scales border nostril; subdigital lamellae distinctly tricarinate | 3 |

- 2b. Scales along dorsal midline from axilla to groin 60 or more; four or five scales border nostril; subdigital lamellae smooth or very indistinctly tricarinate 4
- 3a. Adpressed hind limb reaches elbow or nearly to axilla; range: Israel west through Egypt and Sudan to Algerian Sahara *Tropicolotes steudneri* Peters
- 3b. Adpressed hind limb reaches beyond shoulder; range: eastern Sinai Peninsula, possibly west into Libya *T. nattereri* Steindachner
- 4a. Internasals not differentiated from adjacent scales; four scales border nostril; postmental shields absent, or one small pair not in contact; males with two preanal pores; range: West Pakistan: Baluchistan mountains near Quetta *T. depressus* Minton and J. A. Anderson
- 4b. Internasals large, followed by a second pair of enlarged shields; five scales border nostril; postmental shields well developed; males without preanal pores 5
- 5a. A single pair of postmentals, not in contact; dark crossbars of body absent or indistinct, sometimes two dorsolateral series of white spots; range: Iran: western foothills of Zagros Mountains *T. helenae* (Nikolsky)
- 5b. Two pairs of postmental shields; dark crossbars on tail distinct 6
- 6a. Dark dorsal crossbars of body and tail broader than interspaces; range: Iran: western foothills of Zagros Mountains *T. persicus bakhtiari* Minton, S. C. Anderson, and J. A. Anderson
- 6b. Dark dorsal crossbars of body and tail narrower than interspaces 7
- 7a. Dark crossbars less than half width of interspaces; 82 scales along dorsal midline from axilla to groin; range: Iran-West Pakistan border region *T. persicus persicus* (Nikolsky)
- 7b. Dark crossbars as wide or slightly narrower than interspaces; 62-76 scales along dorsal midline from axilla to groin; range: West Pakistan: coastal plain from Bela to Haleji near Tatta, upper Hab River Valley, and Nabisar in the Thar Desert east of the Indus *T. persicus euphorbiacola* Minton, S. C. Anderson, and J. A. Anderson
- 8a. Dorsal scales strongly heterogeneous; range: Iraq: Salahedin (known only from the type) *T. heteropholis* Minton, S. C. Anderson, and J. A. Anderson
- 8b. Dorsal scales homogeneous 9
- 9a. Postmentals not in contact; 50-52 midbody scale rows; range: Hadramaut, Arabia *T. scortecci* Cherchi and Spano'
- 9b. Postmentals in contact 10
- 10a. Less than 50 midbody scale rows 11
- 10b. Midbody scale rows 46-54 (mean 52); range: Mali *T. tripolitanus* subspecies¹
- 11a. A pair of very large postmental shields in contact, followed by a second, smaller pair 12
- 11b. A single pair of large postmental shields in contact, no second pair distinguishable as such 13
- 12a. Anterior postmental shields extending backwards to form a long suture with lower labial thus excluding posterior postmentals from contact with first lower labial; midbody scale rows 42-48; range: Egypt west through Libya to Tunisia *T. tripolitanus tripolitanus* Peters
- 12b. Anterior postmental shields usually not extending backwards as far as second lower labial so that posterior postmental shields are in contact with first lower labial; midbody scale rows 35-41; range: Somalia *T. tripolitanus somalicus* Parker

¹ An undescribed population from Mali appears most closely allied to *T. t. tripolitanus*, but having a greater number of scale rows at midbody (Ted Papenfuss, personal communication).

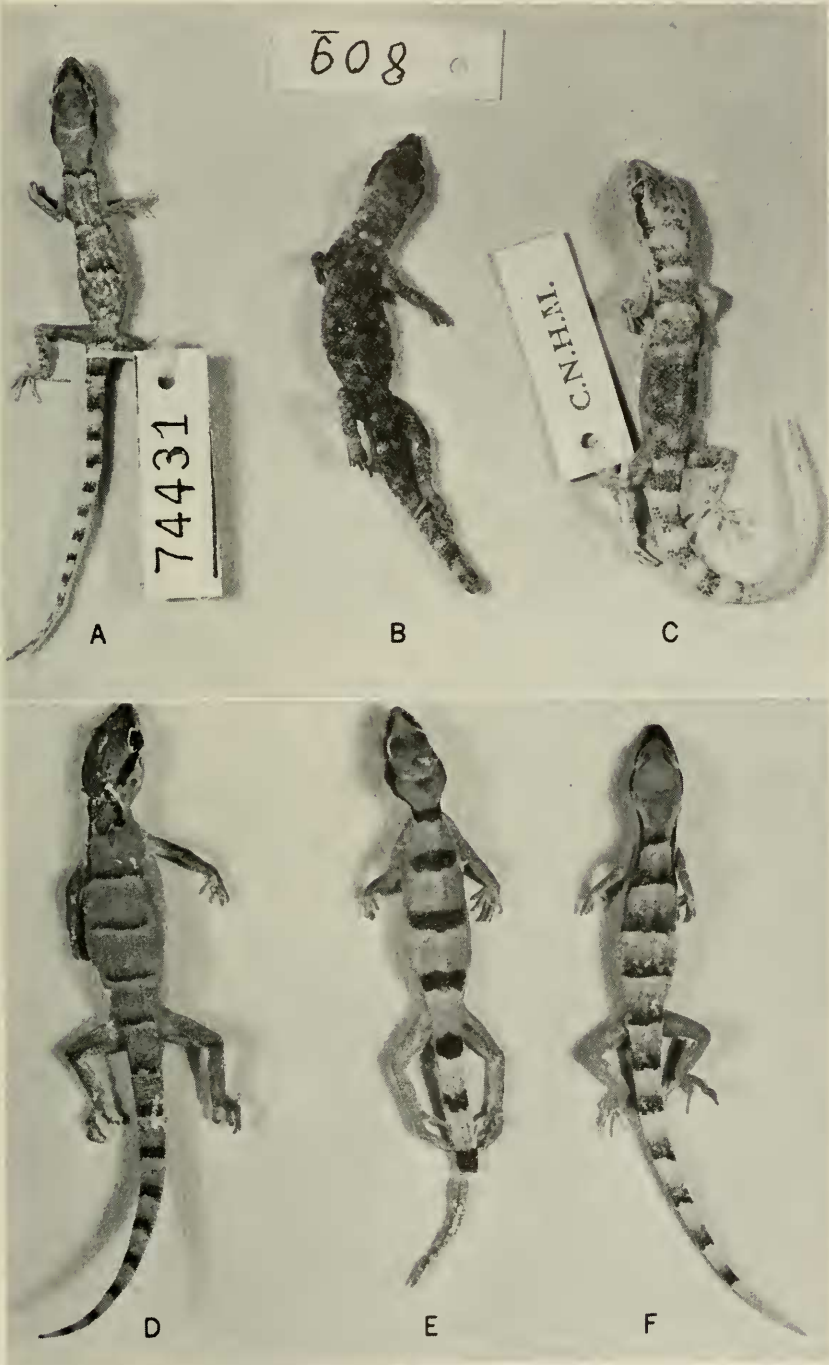
- 13a. Postmental shields extending backwards to form a short suture with second lower labial; supraorbital scales imbricate, smaller than those on interorbital region; midbody scale rows 44-46; range: Algerian Sahara *T. tripolitanus algericus* Loveridge
- 13b. Postmental shields failing to reach the second labial; supraorbital scales imbricate, larger than those on interorbital region; midbody scale rows 40-41; range: Spanish Sahara *T. tripolitanus occidentalis* Parker

In the above key we have followed Loveridge's (1947) key to the subspecies of *T. tripolitanus*, as we have seen little north African material. In treating the forms allied to *T. persicus* as subspecies of this form we follow Loveridge's treatment of the "*tripolitanus*" group for the sake of consistency. We do not imply that we have any knowledge of a zone of intergradation between any two of the currently recognized taxa. The distributional limits of these various forms remain to be elaborated in all cases.

The dwarf geckos of north Africa, *Tropiocolotes tripolitanus* and its subspecies, differ strikingly from the eastern forms in body lepidosis, both dorsal and ventral scales being strongly keeled. The scales are larger than in the eastern forms. Counted along the dorsal midline from the level of the axilla to a point on line with the insertion of the hind legs, they number 32 to 34 in the subspecies "*algericus*" and 33 to 37 in the subspecies "*tripolitanus*." With regard to other characters studied, the subdigital lamellae are strongly tricarinate and number 14 to 15 on the fourth toe; the postrostral and internasal scales are not markedly larger than the surrounding scales; there are 6 or 7 upper labials; the anterior postmentals are large and in contact with each other; the posterior postmentals are half or more the size of the anterior pair in Libyan specimens, about one fourth as large as the anterior in Moroccan specimens. Moroccan specimens show 6 or 7 irregular transverse dark bands on the body; Libyan specimens are dark speckled. In both, the dark tail bands are wider than the interspaces separating them and number 11 in the only specimen with an intact, unregenerated tail. A population related to the "*tripolitanus*" group has recently been discovered in Mali by Mr. Ted Papenfuss of the University of San Francisco. He is preparing a report on this form. *Tropiocolotes scortecci* Cherchi and Spano', recently described from the Hadramaut of southern Arabia, appears to be closely allied to *T. tripolitanus*, differing from the latter in having the postmentals separated by one or two scales, 50-52 scales around the middle of the body, and 15-17 lamellae under the fourth toe.

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FIGURE 3. A. *Tropiocolotes steudneri* from Wadi Raman, Negev, Israel (FMNH 74431); B. From Luxor, Egypt (SAM 809); C. From Hurghada, Red Sea Governate, Egypt (FMNH 78393); D. *Tropiocolotes persicus persicus* from Mirjawa, West Pakistan (SAM 937); E. *Tropiocolotes depressus* from Kolpur, West Pakistan, paratype (RSM 1964.58.1); F. *Tropiocolotes persicus euphorbiacola* from Haleji, West Pakistan (SAM 600).



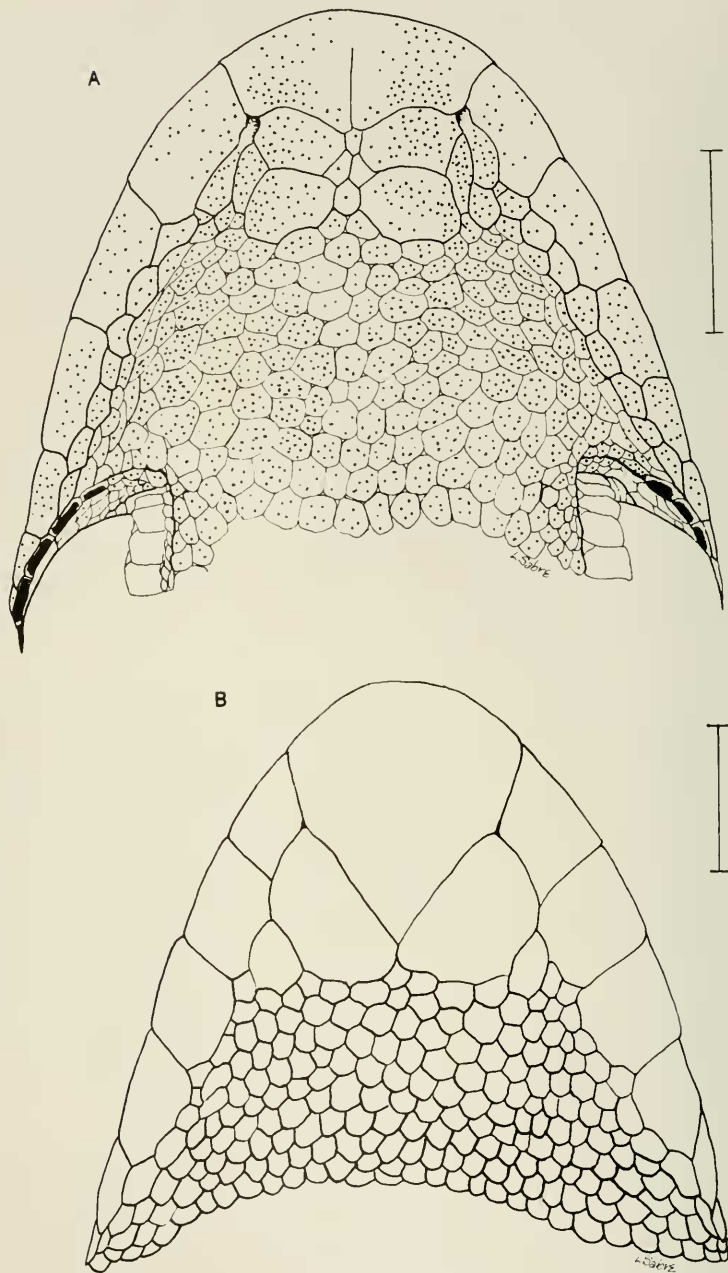


FIGURE 4. A. *Tropiocolotes persicus bakhtiari*, holotype (CAS 86408), scales of snout; B. Scales of chin. (Vertical lines represent 1 mm.)

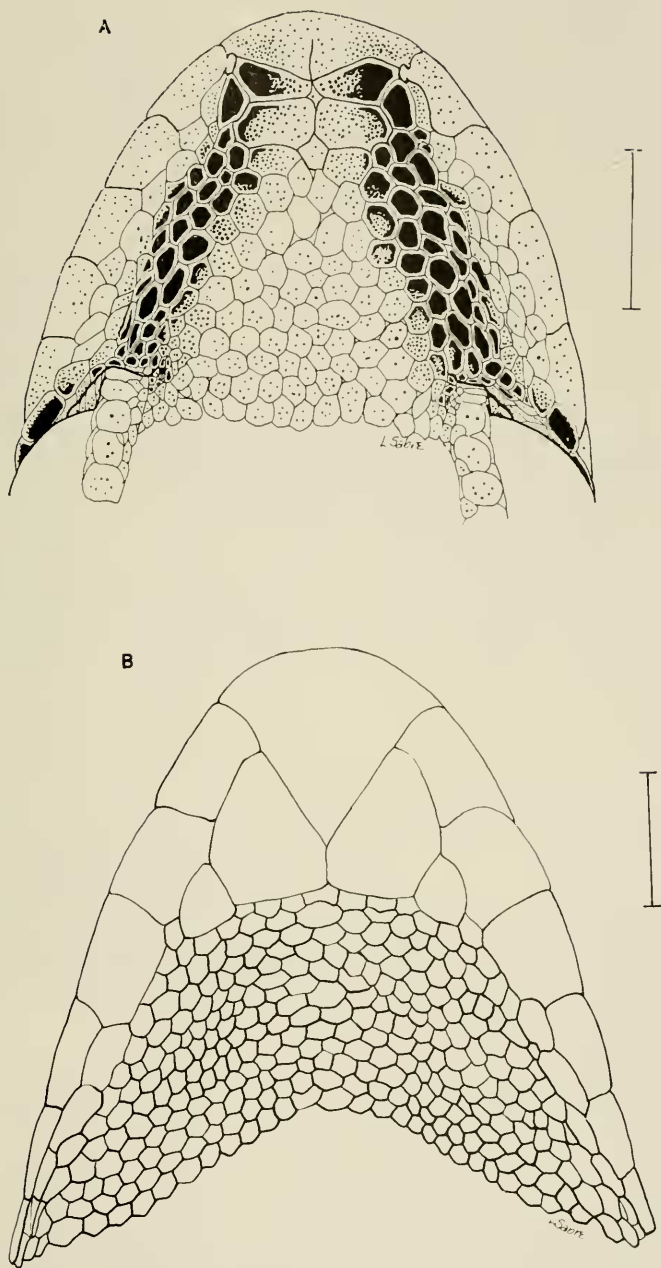


FIGURE 5. A. *Tropicolotes persicus euphorbiicola*, holotype (CAS 93939), scales of snout; B. scales of chin. (Vertical lines represent 1 mm.)

TABLE 1. *Comparisons of Tropiocolotes steudneri*, *T. persicus*, *T. depressus*, and *T. helenae*.

	Number of specimens	Supra-labials	Infra-labials	Postmentals	Scales along dorsal midline, axilla to groin		Internasals	Dark crossbars	
					Lamellae 4th toe			Body	Tail
<i>Tropiocolotes steudneri</i> Egypt	12	6-9 mode 8	6-8 mode 6	2 large pair both usually in contact in midline	38-50	14-19 tricarinate	small, poorly differentiated from adjacent scales	poorly developed	12 slightly wider than interspaces
<i>Tropiocolotes steudneri</i> Israel	5	7-8 mode 7	5-7 mode 6	same as above	41-48	14-16 tricarinate	same as above	4, 5 or none; light margin	13 equal to interspaces
<i>Tropiocolotes persicus</i> <i>persicus</i>	1	8/9	8	Posterior pair less than half size of anterior; neither in contact	82	15 smooth	large and followed by second pair of shields	5; distinct light margin	9 narrower than interspaces
<i>Tropiocolotes persicus</i> <i>bakhtiari</i>	1	9-10	7	Posterior pair smaller than anterior; anterior pair in contact	71	12 weakly tricarinate	same as above	5; without light margin	10 wider than interspaces
<i>Tropiocolotes persicus</i> <i>euphorbiacola</i>	34	7-9 mode 8	6-8 mode 7	Posterior pair not more than half size of anterior; anterior pair in contact	62-76	12-16 smooth	same as above	5; usually with light margin	6-8 narrower than interspaces
<i>Tropiocolotes depressus</i>	2	8-9	7	Absent or one small pair not in contact	65-73	17-18 smooth	not differentiated from adjacent scales	4 or 5; dark without light margin	6 narrower than interspaces
<i>Tropiocolotes helenae</i>	20	6-7 mode 7	5-6 mode 6	One pair, not in contact	70-82	13-14 smooth	large and followed by second pair of shields	5, poorly developed, or none	8-10 narrower than interspaces

In *Tropicolotes steudneri* the dorsal and ventral body scales are smooth and imbricate, smaller than in *T. tripolitanus*, numbering 38 to 50 along the dorsal midline from axilla to groin. Subdigital lamellae are tricarinate, numbering 14 to 19 on the fourth toe. The internasals are slightly larger than the adjacent snout scales. The posterior pair of postmentals are more than half the size of the anterior pair; both pairs are usually in contact with each other in the midline or the posterior pair may be just separated. Transition in size from postmentals to gular granules is gradual with 3 to 6 small scales behind the postmentals. The dorsal pattern may be one of crossbands or mottling; occasional individuals are almost unicolor.

The distribution of *T. steudneri* is from Egypt and northern Sudan through Sinai and most of Israel and presumably into parts of Jordan and Saudi Arabia. On the basis of material examined, there appears to be significant difference between specimens from Egypt and those from Israel (see table 1 and fig. 3a-c). Being unfamiliar with the full range of variation in these areas, we prefer to call attention to the apparent differences and refer the problem to those with more material at their disposal and some field knowledge of the animals involved.

Recently, Mr. Robert Tuck (in press) has recorded a series of specimens collected in southwestern Iran. These specimens agree in their pholidosis with Nikolsky's (1907) description of *Microgecko helenae*. Nikolsky's type series of nine specimens has been destroyed (S. C. Anderson, 1961).

***Tropicolotes helenae* (Nikolsky).**

(Figures 6A-B, 8, 9.)

Microgecko helenae NIKOLSKY, 1907, Ann. Mus. Zool. Acad. Imp. Sci. St. Pétersbourg, vol. 10 (1905), pp. 265-268, pl. 1, fig. 4, 4a (type locality: Iran: Khuzistan Province: Alchorschir; Aguljaschker; Isfagan; Bidezard [Bid Zard]. Syntypes destroyed). WERNER, 1936, Festschrift Strand, vol. 2, p. 200 (listed).

Tropicolotes helenae, TUCK (in press).

MATERIAL EXAMINED (20). USNM 153693-153703, 153705-153710, CAS 120795-120796, Iran: Khuzistan Province: 35 km. east of Gach Saran. USNM 153731, Iran: Khuzistan Province: 16 km. south of Masjed Soleyman.

DIAGNOSIS. Dorsal scales homogeneous, smooth, subdigital lamellae smooth; a single pair of postmental shields, not in contact with one another; back with or without indistinct, undulating dark transverse bars, narrower than interspaces; back sometimes uniform, sometimes with two dorsolateral series of white spots; tail with narrow dark transverse bars narrower than interspaces and bordered posteriorly with white; regenerated portion of tail uniform black.

REMARKS. See table 1 for further comparison with other taxa.

Examination of a recently collected specimen of *Tropicolotes* from the Iran-Pakistan border region indicates that it is identifiable with *Alsophylax persicus* (Nikolsky, 1903). We accordingly reassign this species to *Tropicolotes*, the

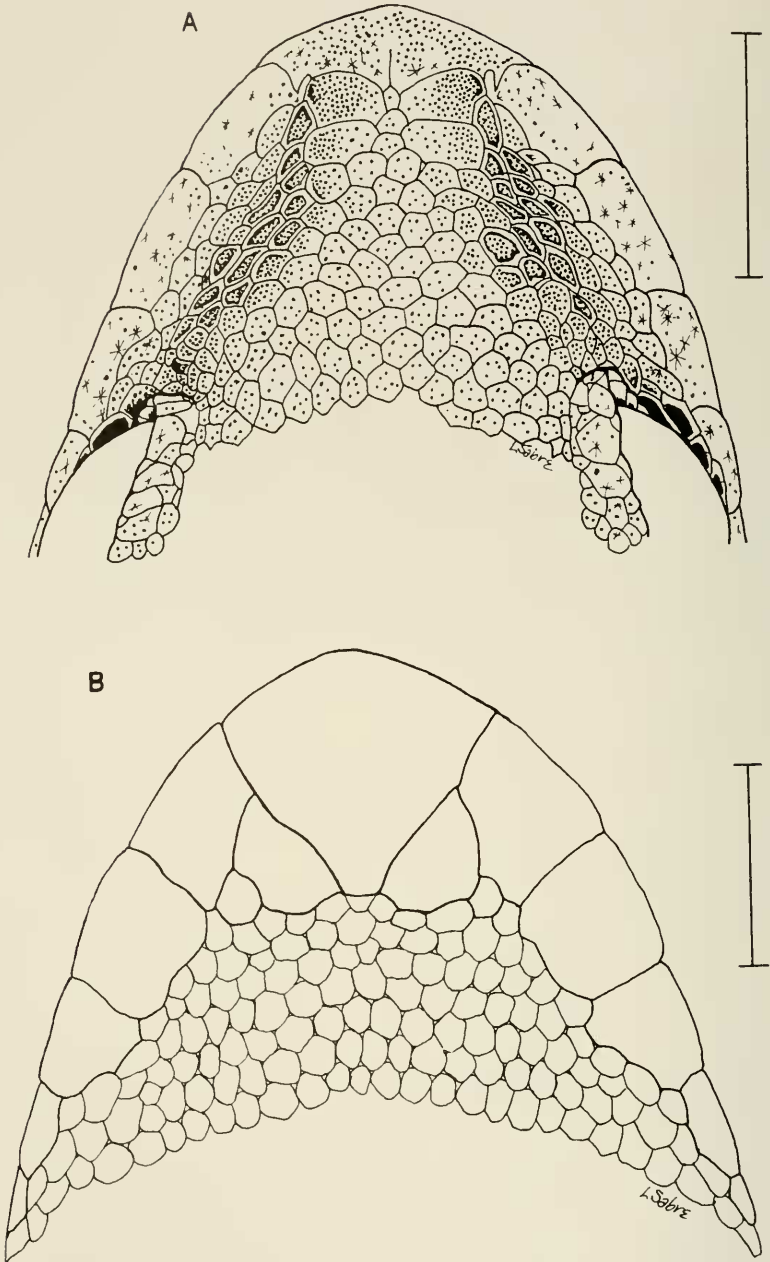


FIGURE 6. A. *Tropiocolotes helenae* (CAS 120795), scales of snout; B. Scales of chin. (Vertical lines represent 1 mm.)

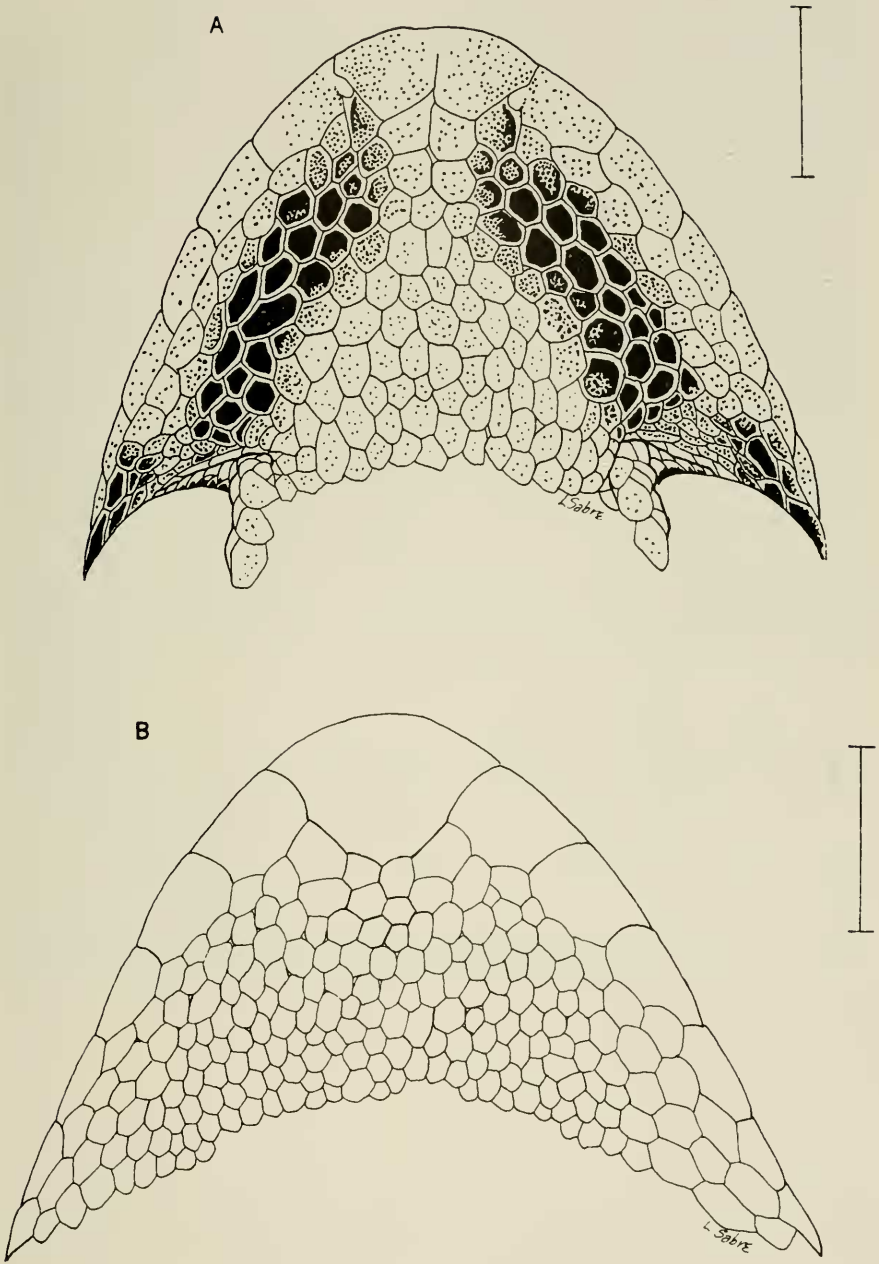


FIGURE 7. A. *Tropicolotes depressus*, holotype (AMNH 93003), scales of snout; B. Scales of chin. (Vertical lines represent 1 mm.)



FIGURE 8. *Tropicolotes helenae* (USNM 153693), showing original tail.

name "*persicus*" apparently being the oldest one available for members of the genus hitherto referred to "*helenae*" by Mertens (1956), S. C. Anderson (1961, 1963), Minton (1962, 1966), and Guibé (1966a, 1966b) (not Nikolsky, 1907).

***Tropicolotes persicus persicus* (Nikolsky), new combination.**

(Figure 3d.)

Alsophylax persicus NIKOLSKY, 1903, Ann. Mus. Zool. Acad. Imp. Sci. St. Pétersbourg, vol. 8, p. 95 (type locality: Iran: Degak [Dehak], in the region of Dizak. Holotype: Zoological Institute Leningrad 10005. WERNER, 1936, Festschrift Strand, vol. 2, p. 200 (listed).

? *Tropicolotes helenae*, MERTENS, 1956, Jh. Ver. Naturk. Württemberg, vol. III, pp. 92-93 (Iran: 20 km. SW Pip. Synonymy of *Microgecko* with *Tropicolotes*).

Bunopus persicus, S. C. ANDERSON, 1963, Proc. Calif. Acad. Sci., 4th ser., vol. 31, p. 474 (listed; new combination, in error).

? *Microgecko helenae*, GUIBÉ, 1966, Bull. Mus. Nat. Hist. Natur., ser. 2, vol. 38, p. 98 (Iran: 100 km. N. Iranshar).

MATERIAL EXAMINED (1). SAM 937, ♀, West Pakistan: Chagai District: Mirjawa, near the Iranian border, collected 9 June 1965, by Jeromie A. Anderson.

DIAGNOSIS. Dorsal scales homogeneous, smooth; subdigital lamellae smooth; dark transverse dorsal bars of body narrow, less than half the width of interspaces, and with distinct light margins; tail bars narrower than interspaces.

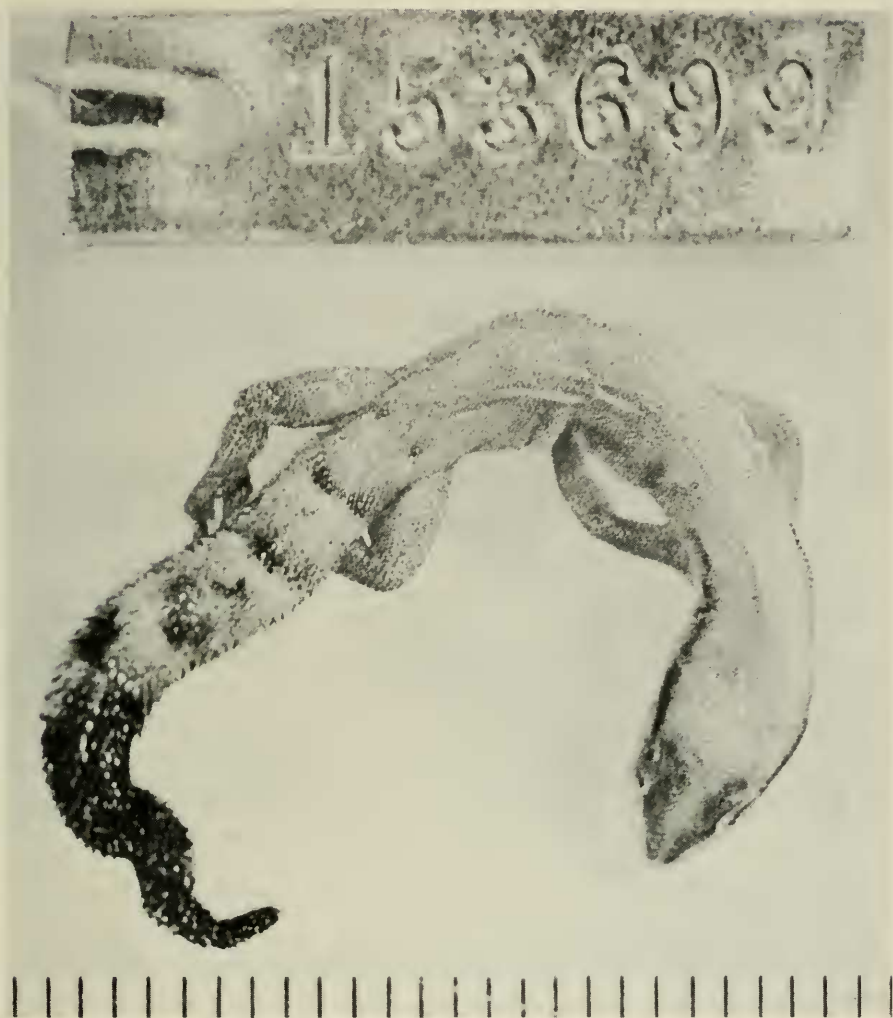


FIGURE 9. *Tropicolotes helenae* (USNM 153699), showing black regenerated portion of tail.

DESCRIPTION. Rostral broader than high, partially divided by midline dorsal furrow; nostril bordered by rostral, first supralabial and three small scales; internasals large, broadly in contact with each other and with rostral; behind them another pair of enlarged shields, also in contact; 10 supralabials; 8/7 infralabials, second barely touching anterior postmental; mental shield-shaped with long posterior projection; anterior postmentals large, separated by single scale behind point of mental and followed by second much smaller pair of postmentals; re-

mainder of mental and gular region covered with small scales of approximately equal size. Ear opening an oblique slit less than half vertical diameter of eye.

Dorsal scales small, subequal, smooth, weakly imbricate, 82 along dorsal midline from axilla to groin; ventral scales similar to dorsals in size and arrangement.

Digits cylindrical, toes with slight angulation between last and next to last phalanx. Subdigital lamellae smooth, margins not pectinate; 15 lamellae on underside of fourth toe. No femoral or preanal pores. Scales of tail and limbs similar to those of body.

Dorsal ground color in life lemon-yellow; five dark transverse bars on body, the first on the neck and the fifth just anterior to the hind limbs, each band much less than half width of interspace between it and next band and bordered posteriorly by distinct whitish band at least half its width. Nine dark bands on tail, much narrower than interspaces, extreme tip of tail black. Dark stripe from tip of snout through eye and along side of head and neck to level of second dorsal band. Limbs without dark markings; venter white.

Measurements of the specimen in millimeters are as follows: snout-vent 30.7; tail 32.6; head (to angle of jaw) 7.8; eye 1.9; snout 3.3; forelimb 11.3; hind limb 13.3.

REMARKS. The fact that five, rather than four, scales border the nostril distinguishes *T. persicus* and its subspecies along with *T. helenae* from all other members of the genus. The uppermost nasal shield (internasal) is large and in contact with its fellow on the midline of the snout. In the other species of the genus, a pair of small internasals lie posterior to the rostral and do not border the nostril. Smaller body scales, smooth subdigital lamellae, lack of contact between the second pair of postmentals, and abrupt transition in size from postmentals to small granular gulars further distinguishes this form from *T. steudneri*. The narrow dark transverse bars with relatively wide light posterior borders distinguish this subspecies from *T. depressus*, *T. p. bakhtiari*, and *T. p. cnthorbiacola*. The presence of a second pair of postmentals distinguishes it from *T. helenae*.

This specimen represents a rediscovery of Nikolsky's species known previously only from the type. Mertens' (1956) specimen which he tentatively identified as Nikolsky's *Microgecko helenae* may belong to this taxon, as may Guibé's from southeastern Iran. We have been unable to examine these specimens. Wettstein's (1960) record of *Cyrtodactylus persicus* from Kabul is based on the form referred to *Alsophylax pipiens* by Leviton and Anderson (1963). We have verified this by examination of his specimen (NMW 15972). The specimen identified as *Alsophylax persicus* Reed and Marx (1959) represents an undescribed form treated elsewhere in this paper. The known range of *Tropiocolotes p. persicus* occupies western Baluchistan in the region of the Iran-Pakistan boundary.

A specimen from Khuzistan Province, southwestern Iran, was previously identified in error as *Microgecko helenae* Nikolsky (S. C. Anderson, 1961, 1963). Because of the many similarities of this specimen to *T. persicus* (Nikolsky), we propose to treat it as a subspecies of the latter.

Tropicolotes persicus bakhtiari² Minton, S. C. Anderson, and J. A. Anderson, new subspecies.

(Figures 4A–B, 10.)

Tropicolotes helenae (not *Microgecko helenae* Nikolsky, 1907), S. C. Anderson, 1961, Wassmann Jour. Biol., vol. 19, pp. 287–289 (Iran: Khuzistan Province: between Masjid-i-Suleiman [Masjed Soleyman] and Sar-i-Gach. Remarks on synonymy of *Microgecko* with *Tropicolotes*).

Microgecko helenae (not Nikolsky, 1907), S. C. ANDERSON, 1963 Proc. Calif. Acad. Sci., 4th ser., vol. 31, pp. 440–441, 474, fig. 10 (notes on collection, photograph).

HOLOTYPE. CAS 86408, adult male (?), between Masjid-i-Suleiman (Masjed Soleyman) and Sar-i-Gach, Khuzistan Province, Iran, collected 13 May 1958, by S. C. Anderson.

DIAGNOSIS. A subspecies of *T. persicus* in which the dark transverse bars of body and tail are broader than the interspaces separating them; anterior pair of postmentals in contact. For additional points of comparison see table 1.

DESCRIPTION OF HOLOTYPE. Habitus moderately depressed; head length (tip of snout to angle of jaw) contained $3 \frac{1}{4}$ times in snout-vent length; length of snout greater than distance between posterior corner of eye and angle of jaw; diameter of eye slightly greater than distance between orbit and nostril; ear opening oval, about $\frac{1}{5}$ diameter of eye; rostral pentagonal, $1 \frac{2}{3}$ times broader than high, cleft in upper half of its height, bordered by first supralabials, nostrils, two postrostrals, and a small scale at its apex. Nostril surrounded by five scales, including rostral, first supralabial, enlarged postrostral, and two additional small nasal scales; enlarged postrostrals separated by small scale in contact with apex of rostral, and followed by additional pair of enlarged scales, also separated in midline by small scale; this second pair of enlarged scales slightly larger than postrostrals. Snout covered with small juxtaposed granules slightly larger than those covering top and sides of head and occiput, granules on side of snout somewhat larger than those on midline. Twenty-two scales across top of head between centers of eyes, 10 supralabials on right, 9 on left, posterior labials distinctly larger than succeeding small granules, but not as sharply set off as in *T. helenae*; 7 infralabials. Mental pentagonal, sharply pointed behind, about $1 \frac{1}{3}$ times longer than broad, followed by pair of trapezoidal postmentals, larger than first infralabial, in contact, and forming short suture behind mental; second smaller

² Named for the Bakhtiari tribe, which gives its name to the general region of Khuzistan in which this gecko was found.

pair (greatest length about $1/3$ greatest length of first pair) lies between first postmentals and posterior portion of second infralabials; scales of chin and throat granular, juxtaposed to subimbricate, subequal to scales on sides of head, and distinctly larger than scales on occiput.

Dorsum covered with equal, smooth, imbricate small scales; scales of venter $1\frac{1}{2}$ times larger than those of dorsum, smooth, flat, imbricate; scales of upper surfaces of limbs similar to those of back, scales of lower surfaces of hind limbs like those of venter; no femoral or preanal pores.

Tail slender, tapering to point, covered above and below with smooth scales, larger than those of dorsum, arranged in regular transverse series, but not arranged to give distinctly segmented appearance to tail, scales of lower surface larger than those of dorsal surface of tail. Two enlarged (but not tubercular nor pointed) scales on either side of swelling at base of tail just posterior to level of vent.

Digits covered above with small, imbricate, smooth scales, below with single series of lamellae, weakly tricarinate (in sense of obtusely bent, not sharply keeled as in *T. tripolitanus* and *T. heteropholis*; perhaps due to preservation, as suggested by Guibé, 1966b). Toe somewhat angularly bent, but not distinctly so as in *Cyrtodactylus* and *Agamura*.

Color in life (S. C. Anderson, 1961): Cream-colored on dorsal surfaces with four chocolate-brown transverse bars in area between shoulders and pelvis, bars broader than interspaces, heaviest pigmentation on posterior margin of each bar; dark brown bar on nape, posterior corners of which extend back and down to meet next crossbar, anterior corners extending forward, meeting dark marking which lies just posterior to eye and over ear opening. Eleven dark crossbars on tail. Limbs, snout, and labials lightly dusted with brown. Ventral surfaces immaculate creamy white.

REMARKS. Examination of Tuck's series of *Tropiocolotes helenae* emphasizes the differences between this specimen and Nikolsky's original description of *Microgecko helenae*. CAS 86408 has ten and nine upper and seven lower labials, while *T. helenae* has six or seven upper and five or six lower labials. The posterior labial shields are more readily distinguished from the following small shields in *T. helenae* than in *T. p. bakhtiari*. Nikolsky describes "*helenae*" as having a single pair of postmental shields, not in contact, the condition in Tuck's series, while *T. p. bakhtiari* has two pairs, the anterior pair in contact. The tail of CAS 86408 is thin, while Nikolsky's and Tuck's specimens have thick tails. The difference, however, is undoubtedly due to the emaciated condition of the specimen of *T. p. bakhtiari*, as specimens of *T. p. euphorbiacola* from West Pakistan (see below) starved before preservation show similarly thin tails. The caudal scales are more conical, the free margins projecting out from the tail to a greater extent in *T. helenae* than in *T. p. bakhtiari*, possibly also an artifact of the poor condi-



FIGURE 10. *Tropicolotes persicus bakhtiari*, holotype (CAS 86408).

tion of the latter. The abdominal scales are proportionately larger than the dorsals in *T. helenae* than in *T. p. bakhtiari* (50–55 from level of axilla to groin in the former species, about 62 in the latter). In *T. helenae* the pair of scales posterior to the enlarged postrostrals on the midline of the snout are smaller than the postrostrals, while in *T. p. bakhtiari* they are larger. The crossbars in *T. p. bakhtiari* are much broader than the interspaces, while in Tuck's series of *T. helenae*, the back lacks crossbars while those of the tail are narrower than the interspaces; Nikolsky's illustration shows the dorsal crossbars to be narrower than the interspaces.

Measurements (in mm.) of the present specimen are as follows: snout-vent 28.0; tail 28.5; head (to angle of jaw) 7.8; eye 2.2; snout 2.8; forelimb 11.1; hind limb 16.1.

The position of the nostril and the nature of the scales of the snout are similar to the specimen of *Microgecko persicus persicus*. The scales of the chin differ only in that the anterior postmentals of CAS 86408 are in contact.

There are 71 scales along the dorsal midline from axilla to groin. The fourth toe has 12 subdigital lamellae. No preanal or femoral pores.

The dark transverse bars of the back are five in number, the first on the neck, the fifth just anterior to the hind limbs. They are 12 scales wide, the interspaces 7 or 8 scales wide. The posterior two scale rows of each bar are darkest.

The population of *Tropicolotes* inhabiting Sind and eastern Las Bela, although closely resembling *T. p. bakhtiari*, is separated from the known range of that subspecies by approximately a thousand miles with part of the intervening territory occupied by *P. persicus*. These zoogeographical considerations add weight to the observed morphological differences between the populations and, in our opinion, justify nomenclatural recognition of the Sind population. Because

the characteristic habitat of this small gecko is clumps of the giant *Euphorbia caducifolia*, we propose the name:

Tropiocolotes persicus euphorbiacola Minton, S. C. Anderson, and J. A.

Anderson, new subspecies.

(Figures 3F, 5A–B, 11.)

Tropiocolotes helenae (not Nikolsky, 1907), MINTON, 1962, American Mus. Novitates, no. 2081, p. 11, fig. 39; 1966, Bull. Amer. Mus. Nat. Hist., vol. 134, p. 81, pl. 15, fig. 1.

HOLOTYPE. CAS 93939, adult male, Lower Pab Hills, Hab Chowki, Las Bela District, West Pakistan, about 350 feet elevation, collected 27 December 1962, by Jeromie A. Anderson.

PARATYPES (26). CAS 93933–93938, 93940–93951, same data as holotype; CAS 99871, 99873–99878, Hab Chowki, Las Bela District, West Pakistan, collected 25 March 1965, by Jeromie A. Anderson; UMMZ 122007 (2 specimens), 7 miles northwest of Karachi, Karachi District, West Pakistan, collected 20 December 1958, by Sherman A. Minton.

DIAGNOSIS. A subspecies of *T. persicus* in which the dark dorsal bands on the body are as wide as, or slightly narrower than the interspaces between them but are always more than half the width of the interspaces. The tail, when regenerated, is white (yellow in life), without dark transverse bars. For additional points of comparison see table 1.

DESCRIPTION OF HOLOTYPE. Scales of snout as in other two subspecies; supralabials 8/9; infralabials 8; anterior postmentals in contact with each other; posterior postmentals less than half size of anterior and not in contact. Scales of body, limbs and tail similar to those of other two subspecies; 74 scales along dorsal midline from axilla to groin; 14 smooth lamellae on underside of fourth toe; no preanal or femoral pores.

Five dark transverse bands on body, anterior border of each being slightly lighter than postanterior; bands in middle of back 8–12 scales wide and separated by interspaces of 10–12 scales; 8 dark bars on tail, narrower than interspaces, extreme tip of tail black. Dark stripe from tip of snout through eye and along side of head, neck, and body to level of third dorsal band.

Measurements (in millimeters) are as follows: snout-vent 28.5; tail 32.5; head to angle of jaw 7.7; eye 2.0; snout 2.9; forelimb 8.8; hind limb 13.7.

REMARKS. In the paratype series, there are 7 to 9 supralabials, 6 to 8 infralabials, 62 to 75 scales along the midline of the back from axilla to groin and 12 to 15 lamellae under the fourth toe. Examination of eight specimens from localities in Dadu, Tatta and Thar Parkar District of Sind does not significantly extend the range of variation (see table 1). The dorsal ground color in life is usually chrome yellow but varies from pale straw to amber. The anterior edges of the bands are irregular and lighter in color, often tending to blend into the ground



FIGURE 11. *Tropiocolotes persicus euphorbiacola*, holotype (CAS 93939) from Lower Pab Hills, Hab Chowki, Las Bela District, West Pakistan.

color; the posterior edges are dark, straight and often edged by a narrow white line.

Specimens preserved soon after capture have thick, rather depressed tails, while individuals kept in captivity and not feeding well soon utilize the fat stored in this appendage. The tails of such animals are thin and more cylindrical.

This dwarf gecko is abundant in the coastal plain from the vicinity of Bela to Haleji near Tatta. Peripheral localities are the Lakhi Hills south of Sehwan, Diwana in the upper Hab River valley, and Nabisar in the Thar Desert east of the Indus. In the Lakhi Hills it has been collected at an elevation of about 700 feet.

These lizards are most readily found in the dry, decayed stems and roots of *Euphorbia caducifolia* after the clump has died and collapsed, forming a low mound. They probably also frequent the living clumps but are difficult to observe among the closely spaced thorny stems. When exposed the geckos try to escape into the plant debris by wriggling the body and tail, making little use of the limbs. They may also flee in agile leaps and bounds, this escape behavior being particularly characteristic when they are surprised in the open at night. Their locomotion in a terrarium is slow and deliberate with bobbing and twisting movements of the head and shoulders when peering about and sinuous movements of the body and tail. Captive individuals show arboreal tendencies, but this has not been observed in the field.

Mature adults are usually found in pairs. A single egg, about 8×5.7 mm., is laid in decayed hollow roots, in crevices, or beneath rocks from April to August. The egg, soft when laid, hardens in a few hours. It is elongated at the ends and

glossy white with longitudinal striations that disappear in about four weeks as the egg enlarges slightly. Hatching requires five to eight weeks. The hatchlings are 13–15 mm. in snout-vent length and are marked similarly to the adults.

In the terrarium, these lizards lap water from a watch glass and feed indiscriminately on arthropods of suitable size, for example, newly hatched spiders and small termites. One captive ate more than 20 small termites in an hour.

The tail is very easily broken, and about a third of the lizards examined have regenerated tails.

***Tropicolotes depressus* Minton and J. A. Anderson.**

(Figures 3E, 7A–B.)

Tropicolotes depressus MINTON AND J. A. ANDERSON, 1965, *Herpetologica*, vol. 21, pp. 59–61, fig. 1 (type locality: West Pakistan: Quetta Division: Kach). MINTON, 1966, *Bull. America Mus. Nat. Hist.*, vol. 134, p. 82, pl. 15, fig. 2 (description, key, habitat, photograph).

REMARKS. Since collecting the two original specimens of this species, one of us (J. A. A.) collected three additional specimens on the eastern slope of Chiltan Mountain, 17 miles south of Quetta and 14 miles north of Mastung 30–31 October 1967. These were collected at about 14.30 from between large granite slabs at about 8500 feet elevation on a 45° hillside, very arid, where the only plants are small shrubs and grasses. They were found while digging out the Afghan rock pika, *Ochotona r. rufescens*, from under rocks two to eight cubic meters in size. A male and female were collected together under one rock. These geckos move much more rapidly than do those of *Tropicolotes persicus euphoribacola* from Sind and Las Bela. When alarmed they assume a “serpentine” position for a few seconds before commencing a steady jerky advance, coming back to a serpentine position at each halt. They also climb rock faces.

Daytime temperatures in this area reach about 15° C. at this time of year and get down to about –4° at night. This and similar areas have been investigated in the same manner in the summer without encountering these geckos.

Numerous small potential predators are present in the immediate vicinity, including scorpions (*Androctonus australis* and *Buthus occitanus*); solpugids (*Galeodes caspius*); centipedes (*Scolopendra* species); young snakes (*Coluber rhodorhachis*, *C. karelini*, *Vipera lebetina obtusa*, and *Echis carinatus*); lizards such as *Eumeces schneideri blythianus*; Baluch shrews; and hedgehogs (*Hemichinus megalotus*).

The series of three specimens was sent to Professor Robert Mertens at Senckenberg, Frankfurt-am-Main.

In examining specimens previously identified as *Alsophylax persicus*, we found a highly distinctive small gecko that appears to be undescribed. We propose for it the name:

Tropicolotes heteropholis Minton, S. C. Anderson, and J. A. Anderson, new species.

(Figure 12.)

Alsophylax persicus (not Nikolsky, 1903), REED AND MARX, 1959, Trans. Kansas Acad. Sci., vol. 62, p. 97 (Iraq: Erbil Liwa: Salahedin Nahiya: Salahedin: Pirman Hotel).

HOLOTYPE. Field Museum of Natural History 74549, immature female, Iraq; Erbil Liwa: Salahedin Nahiya: Salahedin: Pirman Hotel, 1080 meters elevation, collected 1954–1955 by Charles A. Reed.

DIAGNOSIS. A species of *Tropicolotes* with strongly carinate subdigital lamellae and strongly keeled dorsal scales of highly variable size.

DESCRIPTION OF HOLOTYPE. Snout longer than distance between eye and ear opening; rostral nearly twice as broad as high, cleft above; nostril between rostral, first supralabial, and two nasal shields; supranasal shields separated by single internasal; scales of snout and top of head subequal, strongly keeled, subimbricate; scales of occipital and temporal region heterogeneous, strongly enlarged scales intermixed with smaller ones; 12/11 supralabials, posterior two or three strongly keeled; seven infralabials; mental pentagonal, pointed behind; pair of large, roughly pentagonal postmentals broadly in contact behind mental, followed by smaller but well developed pair; diameter of eye shorter than distance between eye and nostril or eye and ear opening; ear opening vertical oval, diameter equal to about 1/3 diameter of eye.

Scales of back imbricate, strongly keeled, heterogeneous, enlarged scales in about 12 more or less regular longitudinal rows, separated by much smaller scales of diverse sizes. Scales of venter smaller than enlarged dorsals, uniform, imbricate, strongly keeled, keels forming regular longitudinal lines; about 53 scales round middle of body and 38 along dorsal midline from axilla to groin.

Forelimb reaches to center of eye, and 2/3 distance to groin; hind limb reaches to axilla. Forelimb covered above with more or less homogeneous small, keeled scales; hind limb covered above with heterogeneous keeled scales, strongly enlarged scales intermixed with smaller. Digits cylindrical, covered above with uniform keeled scales, below with single series of transversely broadened lamellae, each with three to five strong keels, ends of which form mucronations. Third toe longest, second and fourth about equal, 15 lamellae under fourth toe.

Tail covered above with heterogeneous keeled scales, greatly enlarged scales arranged in regular longitudinal and transverse series, not in contact; covered below with smaller, unequal keeled scales, no enlarged subcaudal plates.

No preanal or femoral pores. All scales of head, body, limbs, and tail strongly keeled, with exception of rostral, mental, postmentals and labials.

Unfortunately, the specimen is rather strongly stained with rust. There appear to be five narrow dark bars on the body and alternating light and dark bars



FIGURE 12. *Tropicolotes heteropholis*, holotype (FMNH 74549) from Salahedin, Salahedin Nahiya, Erbil Liwa, Iraq.

of about equal width on the tail. The melanophores are contracted and more numerous on the dorsal than on the ventral surface.

Measurements (in mm.): snout-vent 20.4; tail 19; head (to angle of jaw) 6.7; eye 1.4; snout 2.3; forelimb 6.6; hind limb 8.8.

REMARKS. The affinities of *T. heteropholis* appear to be with *T. tripolitanus*, although *T. heteropholis* differs from all other members of the genus in having strongly heterogeneous dorsal scales.

According to Reed and Marx (1959), the specimen was collected under a bit of bark on the cement floor of the back porch of a hotel, and may have come in with a load of scrub-oak firewood.

This specimen clearly does not belong to *Alsophylax persicus* Nikolsky as originally identified. *Alsophylax persicus* is a nontuberculate, barred gecko with uniform, smooth scales (see above). Reed and Marx (1959) state that this specimen can be distinguished readily from *Gymnodactylus heterocercus* Blanford by the keeled ventral scales and the fact that the forelimb does not reach the tip of the snout. Only the latter is a valid distinction, as no mention of the nature of the ventral scales is made by Blanford (1876). While Blanford states that his specimens of *Gymnodactylus heterocercus* were gray throughout, with markings, his illustration (pl. 22, fig. 3) shows a gecko with six indistinct dusky transverse bars. Blanford's description, with the exception of the length of the forelimb, is insufficient to clearly separate *G. heterocercus* from the lizard described here. Wettstein (1951) had two specimens from Hamadan, Iran, the type locality of *G. heterocercus*, and which he identified as such. These had dark violet-gray bars on the dorsum. No mention is made of the ventral scales or the nature of the subdigital lamellae.

We have not been able to examine Blanford's types of *Gymnodactylus heterocercus*, which are in the Turin Museum. We append herewith a redescription of

Gymnodactylus heterocercus based upon specimen number 7286 in the Vienna Museum.

***Cyrtodactylus heterocercus* (Blanford).**

(Figure 13.)

Gymnodactylus caspius (in part; not Eichwald, 1831), DE FILIPPI, 1865, Viagg. in Persia, p. 352.

Gymnodactylus heterocercus BLANFORD, 1874, Ann. Mag. Nat. Hist., ser. 4, vol. 13, pp. 453–454 (type locality: Iran: Hamadan; two syntypes: Turin Museum). 1876, Eastern Persia, pp. 345–347, pl. 22, fig. 3.

DIAGNOSIS. Dorsum with enlarged trihedral tubercles; no enlarged subcaudal plates, tail covered below with strongly keeled, imbricate scales in 5–7 longitudinal rows; sides of tail with greatly enlarged, sharply keeled, mucronate scales.

DESCRIPTION OF NMW 7286 (Iran: Hamadan, collected June 11, 1950 by H. Löffler). Habitus depressed; snout $1\frac{1}{3}$ times distance between eye and ear opening; rostral $1\frac{1}{2}$ times broader than high, cleft above, upper portion curved backward onto surface of snout; nostril between rostral, first upper labial, and three nasals; separated by small internasal; scales of snout and top of head somewhat heterogeneous in size; juxtaposed tubercular, smooth to weakly keeled or conical; temporal and occipital region with scattered keeled or conical tubercles; 9/10 supralabials, 7 infralabials; mental pentagonal, pointed behind; a pair of large, unequally hexagonal postmentals broadly in contact behind mental, followed by two smaller, but well developed pairs, the second partially, and the third entirely separated from infralabials by smaller scales; diameter of eye slightly less than distance between eye and nostril or eye and ear opening; ear opening sub-circular, about $\frac{1}{4}$ diameter of eye.

Scales of back imbricate, most smooth, a few weakly keeled; enlarged strongly keeled, tubercular, weakly trihedral scales in 14 regular longitudinal rows (outermost row smallest); enlarged scales about as broad as wide, much larger than interspaces. Scales of venter smaller than dorsal tubercles, uniform, imbricate, weakly keeled (keels most noticeable on outer rows); about 59 scales round middle of body, about 87 along dorsal midline from axilla to groin (not counting enlarged tubercles).

Forelimb reaches nostril or tip of snout, $\frac{2}{3}$ distance to groin; hind limb reaches axilla. Upper arm covered above with equal, keeled, imbricate scales, lower arm with scattered enlarged, keeled tubercles; hind limbs with numerous, greatly enlarged trihedral, mucronate, keeled tubercles. Both fore and hind limbs covered below with keeled homogeneous scales. Digits cylindrical, or even slightly depressed at base, terminal phalanges compressed; fingers and toes strongly angularly bent, claws (at least in this specimen) very short, scarcely projecting beyond surrounding ungual scales; subdigital lamellae smooth, in single transversely broadened series. Fourth toe longest, bearing 21 subdigital lamellae.



FIGURE 13. *Cyrtodactylus heterocercus* (NMW 7286).

Tail covered above with heterogeneous keeled scales, enlarged tubercular scales arranged in regular verticils, those immediately on either side of midline being smaller than enlarged tubercles of back, outer three on either side being progressively enlarged, very sharply keeled, mucronate, largest being nearly as long as diameter of eye; tail covered below with small, imbricate, sharply keeled scales in 5-7 longitudinal rows, not arranged in distinct verticils, outermost row enlarged, tubercular though smaller than lateral tubercles.

No preanal or femoral pores (specimen is apparently a female).

About 8 indistinct dark angular crossbars on dorsum, apices pointing caudad, first bar on neck, 8th across sacral region; these tend to fuse and coalesce; 13 dark bars on tail.

REMARKS. There is a pronounced cutaneous fold from axilla to groin; this may be an artifact of preservation, as the specimen is not particularly well preserved.

Although we have seen neither *Gymnodactylus danilewsky* Strauch 1887, nor *G. colchicus* Nikolsky 1902, the affinities of *Cyrtodactylus heterocercus* would appear to be with these forms, judging from the descriptions (Nikolsky, 1915). Terentjev and Chernov (1949) considered both *G. danilewsky* and *G. colchicus* only subspecifically distinct from *Cyrtodactylus kotschy*. *Cyrtodactylus heterocercus* is distinguished from the typical form of *C. kotschy* by the lack of smooth enlarged subcaudal plates, and from *G. danilewsky* by lack of enlarged internasals and the nature of the very large lateral tubercular caudal scales

(compare with Nikolsky, 1915, text-fig. 19, and Terentjev and Chernov, 1949, text-fig. 57). In the descriptions of *G. danilewsky* and *G. colchicus*, no mention is made as to whether the subcaudal scales are smooth or carinate. The latter form should be examined to determine whether or not it may be identical to *Cyrtodactylus heterocercus*. *Cyrtodactylus russowi* (Strauch) has smooth subcaudal scales.

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